Chapter 8. ECONOMIC IMPACT ANALYSIS (EIA)

8.1 Results in Brief

This chapter is not intended to present a full macroeconomic analysis of the impact of the regional haze (RH) illustrative progress goals on the U.S. economy as a whole. Rather, it is intended to portray potential impacts on various industries resulting from the application of control scenarios as part of the illustrative analyses conducted in support of the final RH rule. Given the overall size of the U.S. economy and the estimated benefits and costs associated with this new rule, it is reasonable to expect the impact on the economy as a whole will be minor in the first long-term strategy period. This conclusion is especially true in the case of this rulemaking since the State has the flexibility to set the RH goal instead of meeting an Environmental Protection Agency (EPA) mandated goal.

Results from analyses summarized in this chapter suggest the potential for a variety of economic impacts resulting from the application of the hypothetical control scenarios to attain the illustrative RH progress goals. The potential impacts associated with meeting these illustrative goals by the year 2015 are fairly broad but not deep. While a large number of industries may be potentially affected, few establishments are expected to incur any costs. This is true for these progress goals regardless of how fugitive dust controls are treated in the analyses. Which specific industries or which establishments within these industries will actually be affected depends on the control strategy choices of the State and local level and therefore is difficult to predict with assurances of complete accuracy.

It should be noted that the incremental economic impact from any implementation of RH progress goals will vary depending on the visibility goals submitted and approved as part of State plans. If the goals are adjusted through that process to parallel the implementation programs for the Ozone and particulate matter (PM) standards, the economic impacts for meeting the adjusted goals in those areas will be borne by the Ozone and PM programs. To the extent this occurs, incremental control costs may be less than estimated in this RIA. However, there may be some instances in which there are incremental costs and economic impacts associated with the Best Available Retrofit Technology (BART) element of the RH rule. This is because the States have to conduct modeling and analysis as part of the BART determination process. Those costs are reflected in the total estimates for the administrative costs of the rule that are presented in Chapter 7 of the RIA, and in the estimates of costs of the BART element of the RH rule in Chapter 6. In this analysis, economic impacts are estimated assuming no variation in any of the illustrative progress goals for every mandatory Class I Federal area under either emissions control Case A or B.

In addition, based on the emissions management strategies selected by the Grand Canyon Visibility Transport Commission (GCVTC) as part of their partnership to promote visibility progress, the economic impacts may be lower than estimated in this RIA.

A very small proportion of establishments are potentially affected in 2015[1] for most of the standard industrial classification (SIC) codes affected under these illustrative RH progress goals even for results reflecting the upper end of the cost range. For Case A, the emissions control case with fugitive dust controls included, the estimated proportion of establishments potentially affected ranges from 0.3 percent to 1.3 percent for those establishments having control costs of 0.01 percent of sales or greater. Also, less than 0.1 percent of potentially affected establishments in all SIC codes are expected to have control costs of 1 percent of sales or greater. For Case B, the emissions control case without fugitive dust controls, the estimated proportion of establishments potentially affected ranges from 0.5 percent to 1.8 percent for those establishments having control costs of 0.01 percent of sales or greater. In addition, less than 0.1 percent of potentially affected establishments in all SIC codes are expected to have control costs of 1 percent of sales or greater.

A characterization of small entity impacts predicts some potential for negative impacts on small firms and establishments in a number of industries. However, these impacts will likely be mitigated by cost pass-through to consumers, flexible implementation strategies when designed by the States, and new control technologies.

It should be noted here, as in earlier chapters of this regulatory impact analysis (RIA), that the results associated with emissions control Cases A and B represent two different control case scenarios that yield different post-control air quality profiles. Since the post-control air quality results are different, Case B is not a perfect substitute control strategy for Case A.

[1] 2018 is the end of the period for the first long-term strategy. The term “long-term strategy” refers to the set of emission reduction measures the State includes in its SIP in order to meet the reasonable progress goal it has set. 2015 is the nominal “snapshot” year that reflects the partial attainment control cases for the Ozone and $PM_{2.5}$ NAAQS included in the baseline, and is near the end of the period for the first long-term strategy.

8.2 Introduction

This chapter summarizes results of the EIA associated with partial compliance nationwide of the illustrative RH progress goals assessed in this RIA. The level of compliance nationwide with these progress goals, which is nearly complete in the Eastern U.S. but is not in the western U.S., is presented in Chapter 6. The chapter provides information regarding the potential economic impacts associated with the hypothetical control strategy cost estimates[1]. Economic impacts on affected industries and source categories, consumers, and others are assessed.

The different analyses summarized in this chapter include:

- Screening Analysis. This consists of an annual control cost calculated as a percent of sales for establishments in each industry or source category, as classified by 4-digit SIC code.

- Governmental Entities Analysis. This consists of an annual control cost calculated as a percent of revenues for government-owned establishments.

- Small Entity Impacts Analysis. Potential impacts on these entities are characterized using available economic and financial data.

The characterization of small entity impacts in this chapter does not represent a regulatory flexibility analysis (RFA) as defined by the Regulatory Flexibility Act as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA). No RH progress goal assessed in this RIA imposes requirements applicable to small entities. Refer to Chapter 2 for more details on why an RFA is not required for this rulemaking.

The economic impact estimates presented in this chapter are associated with partial compliance with each of these RH progress goals, the results of which are presented in Chapter 6. Estimates associated with full compliance are not computed in this analysis since these estimates are too speculative as input to economic impact estimation, and would not reflect estimates for selected control measures and potentially affected industries.

This analysis builds upon the EIA included within the July 1997 RIA for the promulgated PM and Ozone standards and the proposed RH target program (henceforth referred as the "1997 RIA"). The major change is that the screening analyses were conducted at the 4-digit SIC code level rather than the 3-digit SIC code level as done in the 1997 RIA. Economic impact analyses for the proposed RH target program alternatives could not be completed in time for inclusion in the 1997 RIA.

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[1] See Chapter 3 for a description of the regulatory alternatives examined and Chapter 6 for the control strategy cost results.

8.3 Summary of Affected Industries

The purpose of the profile of affected industries is to summarize various market characteristics of economic sectors potentially affected by revisions to the RH progress goals. An industry profile provides information on economic sectors that may be valuable to the States for examining the impact of implementing RH progress goals. This information is background material for the screening and governmental entities analyses.

8.3.1 Industry Profile - Economic and Financial Data

Economic data used in estimating the potential economic impacts of implementing control measures associated with the illustrative RH progress goals follow the categorization established by the SIC Manual 1987 (U.S. Office of Management and Budget, 1987). The data are reported by 4-digit SIC code, and include: the number of firms and establishments, employment, and sales revenue. The six major sectors are:

- Manufacturing;
- Agriculture, Mining, and Construction;
- Transportation, Communications, and Utilities;
- Wholesale and Retail Trade and Real Estate;
- Services; and
- Public Administration.

Additional information on the profile of affected industries is in section 1.0 of Appendix H of the 1997 RIA, and in the Industry Profile for Review of the NAAQS for PM_{10} (U.S. Environmental Protection Agency, 1996a).

8.4 Screening Analysis - Methodology and Results

8.4.1 Introduction

Given the large number of 4-digit SIC codes potentially affected, it is not feasible to develop a detailed economic profile and EIA for each industry potentially affected by one or more control measures employed in the cost analyses. It is possible, however, to conduct a screening analysis which calculates an annual average cost as a percent of sales for each affected SIC code. The purpose of a screening analysis is to provide some signals of potential economic impacts, to show where a more refined or detailed economic analysis may be warranted, and to eliminate the need for a more extensive analysis of certain SIC codes, particularly in cases where the incremental cost impact is likely to be negligible. It does not, however, reflect any assumptions about specific impacts on a given establishment or type of establishment within an SIC code.

Perhaps the most comprehensive source of sales or revenue data is the 1992 Bureau of the Census' Economic Census Report Series (U.S. Department of Commerce, 1997). This publication provides company, establishment, employment, and sales totals by employment size category (e.g., 101-200 employees) down to a 4-digit SIC code level. Because the Enterprise Statistics data are not available for all potentially affected SIC codes (e.g., agricultural industries), this source was supplemented by other related Census publications (U.S. Department of Commerce, 1990).

Throughout this chapter, the term *establishment* is defined as a single physical location at which business is conducted or where services or industrial operations are performed. It is not necessarily identical to a *firm*, which may consist of one establishment or more. A *firm* is defined as a business consisting of one or more domestic establishments that the reporting firm specified under its ownership or control during the reporting year. *Employment* is defined as all employees (full-time and part-time) as reported on all establishment payrolls. The sales data reported in this chapter are on an establishment, rather than a firm level for two main reasons: (1) the cost input data are provided on an establishment basis, and (2) establishment-level revenue data are available for more SIC codes than firm-level revenue data.

8.4.2 Methodology

An annual cost as a percent of sales screening analysis is conducted to identify those industries or source categories potentially experiencing economic impacts as a result of compliance with the illustrative RH progress goals. Results of the screening analysis provide information regarding the potential severity of impacts on establishments in affected SIC codes.

This calculation, specifically, provides an indication of the magnitude of a price change that would have to occur in order for each industry to fully recover its annual control costs in the year 2015. Taken down to the establishment level, the resulting estimate represents the average price increase necessary for affected establishments in the industry to recover the increased cost of environmental controls. If a price change in affected markets resulting from implementation of the standards is greater than the cost to sales percentage for affected establishments with below average control costs, then those affected establishments will receive revenue in excess of the annual cost of control.

This calculation uses the upper bound of the control costs as inputs. As mentioned in Section 6.1, the results of this calculation may be zero since the States have the flexibility to set RH progress goals rather than meeting an EPA-mandated goal. Therefore, the results shown in this chapter reflect the upper bound of cost impacts.

In order to conduct the screening analysis, it is necessary to:

! Use the cost estimates for control of all visibility precursor emissions associated with the control strategies used in the cost analysis to calculate annual average costs per source category or industry on a SIC code basis;

! Divide the annual average costs by the number of affected establishments in the SIC code to provide an annual average cost per affected establishment for each affected SIC code;

! Divide the average annual cost per establishment by the average sales or revenue per affected establishment in potentially affected industries for each affected SIC code;

The result is the average annual cost as a percent of sales for each affected SIC code. This result is estimated at the establishment level for affected establishments in each SIC code.

The number of establishments are estimated differently depending on the type of emission source. For point sources, the number of affected establishments represents the number of unique plants affected by each control measure. For area and mobile sources, U.S. EPA data are obtained on the number of affected establishments by county and SIC code by projecting from State-level data reported in County Business Patterns (U.S. Department of Commerce, 1991b), since it is not possible to calculate the number of unique establishments affected by each area and mobile source control measure. Generally, the number of establishments in counties reported in County Business Patterns that are affected by control measures is used to estimate the number of affected establishments.

National sales data are available by 4-digit SIC code from the Bureau of the Census' Enterprise Statistics and related publications (U.S. Department of Commerce, 1992). Because of the broad scope of the illustrative progress goals examined in this RIA, average national sales are used. For each potentially affected SIC code, an estimate of national average sales per establishment is prepared and used as the denominator for each average annual cost-to-sales percentage calculated. The annual cost-to-sales percentage estimates reflect the cumulative (total) annual control costs associated with one or more control measures imposed on an industry or source category.

8.4.3 Results

The economic impact results are presented for each emissions control case.

Case A

Table 8-1 presents a summary of the number of industries with potential impacts associated with RH progress goals analyzed at different annual cost as a percent sales thresholds of at least 0.01, 0.1, 1, 3, and 5 percent (U.S. Environmental Protection Agency, 1999b). Under Case A, the four RH illustrative progress goals have the potential to affect some establishments in industries classified in 859 to 896 4-digit SIC codes. This range represents 85 to 89 percent of 1,005 4-digit SIC codes in the 1987 SIC Manual. The number of industries with some establishments potentially affected under these upper bound costs covers a range much lower than that, however. The range of industries with establishments potentially affected is from 49 to 132 4-digit SIC codes with annual costs of 3 percent of sales or greater, and industries in 23 to 63 4-digit SIC codes with some potentially affected establishments may have annual costs of 5 percent of sales or greater. It is important to note that a potential impact on a single establishment is sufficient to result in an industry being considered as potentially affected.

Table 8-1
Summary of Number of 4-digit SICs Having Some Establishments with Potential Economic Impacts for Illustrative Regional Haze Progress Goals[a] in the Year 2015[b,c], for Case A[d]
(Expressed as Average Annual Costs as a Percent of Sales; Control Costs and Sales Are in 1990$)

RH Progress Goal	Number of 4-digit SIC codes Potentially Affected	4-digit SIC codes affected - 0.01 Percent or greater	4-digit SIC codes affected - 0.10 Percent or greater	4-digit SIC codes affected - 1 Percent or greater	4-digit SIC codes affected - 3 Percent or greater	4-digit SIC codes affected - 5 Percent or greater
1.0 deciview/15 year	859	185	85	49	30	23
1.0 deciview/10 year	870	232	100	59	39	28
5% deciview/10 year	869	214	100	56	32	24
10% deciview/10 year	896	327	210	132	87	63

a Represents the 4 regional haze progress goals that are being analyzed in this RIA.
b The proportion of establishments that are potentially affected ranges from 2.1 to 6.9 percent as a percentage of establishments nationwide in 2015 across the four RH progress goals analyzed. The number of establishments nationwide is 15,599,647 (U.S. Department of Commerce, 1997).
[c] It is important to note that a potential impact on a single establishment is sufficient to result in a industry classified in a 4-digit SIC code being included as being potentially affected.
[d] These results reflect visibility improvements achieved with application of fugitive dust controls along with other controls, applied as part of a least-cost optimization procedure described in Chapter 6.

It should be noted that a very small proportion of establishments are potentially affected for most of the SIC codes affected under these RH illustrative progress goals. As shown in Table 8-2, the proportion of establishments potentially affected by these progress goals under Case A ranges from 2.1 to 6.9 percent nationwide across the progress goals. However, these proportions fall to 0.3 to 1.3 percent nationwide across the progress goals for industries potentially having annual costs of 0.01 percent of sales or greater, and from 0.02 to 0.04 percent nationwide across these illustrative progress goals for industries potentially having annual costs of 1 percent of sales or greater.

Table 8-2
Summary of Percentage of Establishments Nationwide with Potential Economic Impacts for Illustrative Regional Haze Progress Goals[a] in the Year 2015, for Case A[b]

RH Progress Goal	Percentage of Establishments Nationwide with Potential Economic Impacts	Percentage of Establishments Nationwide with Potential Control Costs of 0.01 Percent or greater of Sales	Percentage of Establishments Nationwide with Control Costs of 1 Percent or greater of Sales
1.0 deciview/15 year	2.1	0.3	0.02
1.0 deciview/10 year	2.9	0.4	0.02
5% deciview/10 year	2.8	0.4	0.02
10% deciview/10 year	6.9	1.3	0.04

[A] Represents the 4 regional haze progress goals that are being analyzed in this RIA.
[b] These results reflect visibility improvements achieved with application of fugitive dust controls along with other controls, applied as part of a least-cost optimization procedure described in Chapter 6.

The screening analysis indicates that many industries in 4-digit SIC codes may be impacted by implementation of these illustrative progress goals, but many of the SIC codes affected may experience annual cost as a percent of sales below 1 percent and have fewer than 1 percent of their establishments potentially affected. This is for the most part due to the complementarity between the control strategies likely to be employed in implementation of the illustrative RH progress goals and the control strategies likely to be employed in implementation of the Ozone and $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS). As shown in Chapter 6, virtually no establishments in the Midwest/Northeast and Southeast control regions (i.e., virtually every State east of the Mississippi River) are expected to incur costs for the period of the first long-term strategy because the anticipated NAAQS implementation programs (in the baseline for these illustrative goals) result in sufficient visibility improvement to achieve progress objectives. The small percentage of establishments expected to incur costs also results from the fact that not all establishments' emissions have a measurable impact on visibility at Class I areas and that not all establishments offer opportunities for cost-effective air quality improvements. Based *only* on these estimates, and given that most establishments in these SIC codes are not potentially affected, impacts from implementation of these RH illustrative progress goals may not be substantial.

Case B

Table 8-3 presents a summary of the number of industries with potential impacts associated with RH progress goal analyzed at different annual cost as a percent sales thresholds of at least 0.01, 0.1, 1, 3, and 5 percent (U.S. Environmental Protection Agency, 1999b). Under Case B, the 4 RH illustrative progress goals have the potential to affect some establishments in industries classified in 861 to 897 4-digit SIC codes. This range represents 86 to 89 percent of 1,005 4-digit SIC codes in the 1987 SIC Manual. The number of industries with some establishments potentially affected under these upper bound costs covers a range much lower than that, however. However, the number of industries with some establishments potentially affected ranges from 27 to 80 4-digit SIC codes with annual costs of 3 percent of sales or greater, and industries in 21 to 60 4-digit SIC codes in which some affected establishments may have annual costs of 5 percent of sales or greater.

Table 8-3
Summary of the Number of 4 digit SIC Codes with Potential Economic Impacts for Illustrative Regional Haze Progress Goals in the Year 2015[b,c], for Case B[d]
(Expressed as Average Annual Costs as a Percent of Sales; Control Costs and Sales Are in 1990$)

RH Progress Goal	Total No. of 4 digit SIC Codes Potentially Affected	4 digit SIC codes affected - 0.01 Percent or greater	4 digit SIC codes affected - 0.10 Percent or greater	4 digit SIC codes affected - 1 Percent or greater	4 digit SIC codes affected - 3 Percent or greater	4 digit SIC codes affected - 5 Percent or greater
1.0 deciview/15 year	861	195	68	40	27	21
1.0 deciview/10 year	882	249	123	58	35	26
5% deciview/10 year	871	252	128	58	35	22
10% deciview/10 year	897	330	203	125	80	60

a Represents the 4 regional haze progress goals that are being analyzed in this RIA.
b The proportion of establishments that are potentially affected ranges from 2.7 to 8.1 percent as a percentage of establishments nationwide across the four RH progress goals analyzed. The number of establishments nationwide is 15,599,647 (U.S. Department of Commerce, 1997).
c It is important to note that a potential impact on a single establishment is sufficient to result in a industry classified in a 4-digit SIC code being included as being potentially affected.
d These results reflect visibility improvements achieved without application of fugitive dust controls along with other controls, applied as part of a least-cost optimization procedure described in Chapter 6.

It should be noted that a very small proportion of establishments are potentially affected for most of the SIC codes affected under these RH illustrative progress goals. As shown in Table 8-4, the proportion of establishments potentially affected by these progress goals under Case A ranges from 2.7 to 8.1 percent nationwide across the progress goals. However, these proportions fall to 0.3 to 1.3 percent nationwide across the progress goals for industries potentially having annual costs of 0.01 percent of sales or greater, and from 0.02 to 0.04 percent nationwide across these illustrative progress goals for industries potentially having annual costs of 1 percent of sales or greater.

Table 8-4
Summary of Percentage of Establishments Nationwide with Potential Economic Impacts for Illustrative Regional Haze Progress Goals[a] in the Year 2015, for Case B[b]

RH Progress Goal	Percentage of Establishments Nationwide with Potential Economic Impacts	Percentage of Establishments Nationwide with Potential Control Costs of 0.01 Percent or greater of Sales	Percentage of Establishments Nationwide with Control Costs of 1 Percent or greater of Sales
1.0 deciview/15 year	2.7	0.5	0.02
1.0 deciview/10 year	4.6	0.9	0.02
5% deciview/10 year	3.8	0.7	0.02
10% deciview/10 year	8.1	1.8	0.04

[A] Represents the 4 regional haze progress goals that are being analyzed in this RIA.

[b] These results reflect visibility improvements achieved without application of fugitive dust controls along with other controls, applied as part of a least-cost optimization procedure described in Chapter 6.

The screening analysis indicates that many industries in 4-digit SIC codes may be impacted by implementation of these illustrative progress goals, but many of the SIC codes affected may experience annual cost as a percent of sales below 1 percent and have fewer than 1 percent of their establishments potentially affected. This is for the most part due to the complementarity between the control strategies likely to be employed in implementation of the illustrative RH progress goals and the control strategies likely to be employed in implementation of the Ozone and $PM_{2.5}$ NAAQS. As shown in Chapter 6, virtually no establishments in the Midwest/Northeast and Southeast control regions (i.e., virtually every State east of the Mississippi River) are expected to incur costs during the first progress period because the anticipated NAAQS implementation programs (in the baseline for these illustrative goals) result in sufficient visibility improvement to achieve progress objectives. The small percentage of establishments expected to incur costs also results from the fact that not all establishments' emissions have a measurable impact on visibility at Class I areas and that not all establishments offer opportunities for cost-effective air quality improvements.

As in Case A, the screening analysis indicates that many industries in 4-digit SIC codes may be impacted by implementation of these illustrative progress goals, but many of the SIC codes affected may experience annual cost as a percent of sales below 1 percent and have fewer than 1 percent of their establishments potentially affected. Based *only* on these estimates, and given that most establishments in these SIC codes are not potentially affected, impacts from implementation of these RH illustrative progress goals under this control case may not be substantial.

A general comparison of the results under each control case shows that a greater percentage of establishments are potentially affected for each RH progress goal in Case B compared to Case A at an impact of 0.01 percent or higher, but the number of establishments potentially affected is roughly equal at an impact of 1.0 percent or higher. The reason for the greater number of establishments being affected under Case B is that a greater number of stationary sources are now affected. In addition, more industries in 4-digit SIC codes are expected to be affected under Case B compared to Case A. The reason for this occurring is that with fewer control possibilities for area sources in Case B compared to Case A, there is a greater concentration on controls for other source types such as stationary and mobile. Therefore, more industries with stationary source emissions may be expected to impose controls to meet these illustrative progress goals in place of government entities (i.e., State and county government agencies) and agricultural entities who are controlled under Case A. Controls are expected to be placed on more stationary sources in industries such as electric utilities, cement manufacturing, and pulp and paper mills. Also, greater application of control strategies such as control of residential wood combustion (wood stove) emissions and on-highway heavy-duty diesel vehicle emission control may occur if fugitive dust controls are not part of a suite of control strategies for improving visibility, particularly in the affected regions. It should be noted that the residential wood combustion program in the control measure database does not consider such practices as switching to gas logs, thus leading to overestimates of the impacts estimated by this model from applying this control strategy. More of these limitations and uncertainties of this analysis is discussed later in this chapter and in Chapters 5 and 6. Thus, there is some potential for creating or exacerbating problems in some industry sectors as a result of alleviating adverse impacts in some other industry sectors by removing certain burdensome control strategies from consideration.

8.4.4 Limitations, Uncertainties, and Potential Biases

There are a number of limitations and uncertainties associated with these screening analyses that may lead to potential biases in the results. Table 8-5 presents these limitations and uncertainties.

Table 8-5
Limitations and Uncertainties of the Screening Analyses

Limitation/Uncertainty	Potential Bias on Screening Analysis Results
The analysis was conducted at the establishment level rather than the firm level because control costs are not available at the firm level.	Unknown
The results given in this chapter represent the highest annual cost as a percent of sales estimated for each SIC code.	Overestimate
The costs of area and mobile source control measures are not summed with the costs for point source control measures for a given establishment.	Underestimated for industries in SIC codes potentially affected by area and mobile source control measures
Inaccuracies with assignment of 4 digit SIC codes for point source establishments for which an SIC code was lacking or inaccurate.	Unknown
For some area and mobile source control measures, difficult to identify the SIC codes that incur control costs because area and mobile source inventories report emissions at county/source category level.	Unknown; total costs allocated to SIC codes identified as potentially affected may be over- or underestimated
Exact number of establishments is unknown because there is no direct relationship between the county-level cost estimates and the number of establishments reported for SIC codes.	Overestimate, since actual number of affected establishments is likely overstated. This is a result of the procedure of identifying affected establishments as part of the procedure allocating costs to individual establishments.
County-level establishment data only available at the 2 and 3-digit SIC code level. 4-digit SIC code establishment counts by county estimated by multiplying 2- and 3-digit SIC code county data by State-level 4-digit SIC code establishment proportions	Unknown; approach adds uncertainty to cost allocation methodology, but the direction of bias is not known
For the dust control plan measure for construction activities (pertains to Case A only), the number of acres of construction work by SIC code and county is the best indicator for economic analysis. This information was not available; number of establishments reported by SIC code and county used instead.	Unknown
The available data for allocating on-highway HDDV retrofit control measure costs to SIC codes do not distinguish between gasoline and diesel vehicles.	Unknown; analysis results will be inaccurate to the extent that heavy-duty diesel trucks are used by different industries than heavy-duty gasoline trucks
Costs for some area source control measures could not be allocated to SIC codes because establishment counts were not available for the SIC codes affected by the measure. In these cases, costs were allocated to potentially affected SIC codes using the sum of establishment counts for all of the counties within the State.	Unknown; costs may be overestimated for some SIC codes and underestimated for others

Lack of methodologies for allocating costs of various mobile source control measures to private/nonprofit entities.	Underestimate
For NO control measures applied to area source fuel combustion categories, average cost per establishment is the same for each SIC code since information was not available to identify specific costs for individual industries.	Unknown
For area and mobile source measures, county-level costs are divided by the number of establishments reported for the county for the potentially affected SIC codes. The average cost per establishment is an underestimate if the number of potentially affected establishments is less than the total number of establishments reported for the SIC codes.	Underestimate
Use of national sales and establishment data to calculate average sales per establishment by SIC code.	Unknown; if high costs are incident on large entities, then the use of average sales per establishment data leads to overestimated impacts

8.5 Environmental Protection Activities

Even though an industry may bear a regulatory burden, the economic impact may be offset if other industries use its product in pollution control activities. For example, the potential direct economic impact associated with implementation of these illustrative RH progress goals on the electric utility industry is likely to be negative. However, electricity is required to operate pollution control equipment used in other industries, and the electric utility industry will receive revenues from additional operation of pollution control equipment associated with the implementation of these illustrative progress goals. Another example is that of the construction industry sector which may experience negative economic impacts from compliance with these RH progress goals. However, the results of the environmental protection (EP) industry model prepared for the 1997 RIA show that the services of the construction industry sector may be in strong demand due to the capital expenditures required in other industries serviced by the construction sector as a result of implementation strategies associated with compliance with these progress goals. Also, an additional source of revenue for the construction industry sector is from increased pollution control spending by governmental agencies associated with implementation of these illustrative progress goals. As a consequence, the net economic impact to the construction industry sector could be positive. Similar comparisons can be made for other industries that these progress goals may potentially affect.

It is important to characterize the relationship of the analysis described above to the other analyses presented in this RIA. The revenues that are projected by this analysis reflect the fact that each purchase for pollution control has a buyer and seller. While a dollar spent by the purchaser of a control device or service is a cost, it is also revenue for the seller. This should not be confused with social cost which enters into a benefit-cost analysis. It is another element of the distributional analysis which focusses on the impacts of the costs incurred in meeting regulatory requirements. Revenue gain to the seller should not be confused with profit. In the long run in a competitive market, revenues for the good or service being sold will be offset by the costs of producing the good or service.

8.6 Small Entity Impacts

8.6.1 Introduction

As explained in the preamble to the final rulemaking and in Chapter 2 of this RIA, these RH progress goals are illustrative and will not impose any regulatory requirements on small entities. Any such requirements would arise from subsequent State regulatory actions. As a result, EPA is not required to conduct a regulatory flexibility analysis under the RFA, as amended by the Small Business Regulatory Enforcement Fairness Act (RFA/SBREFA). Nonetheless, EPA has conducted a more limited analysis of the potential impact on small entities of possible State strategies for implementing any of these illustrative progress goals in order to provide relevant information to the States as they prepare implementation strategies. The results of this analysis are presented below. It should be noted that the results presented below reflect the upper bound of control costs as shown in Chapter 6.

8.6.2 Methodology for Characterization of Potential Impacts

Small entity impacts are characterized as follows (U.S. Environmental Protection Agency, 1997c):

(1) Once the annual cost-to-sales percentages are computed in the screening analysis described above in section 8.3, the results of this analysis are shown in Appendix D. This data, which includes estimates of the percentage of establishments potentially affected, and average annual costs as a percent of sales for potentially affected industries classified by 4-digit SIC codes are presented for each RH progress goal under both emissions control cases.

(2) Strategies to mitigate potentially small entity impacts are then presented. Many of these have been implemented in various areas in the U.S.

8.6.3 Results

Appendix D contains data on the industries classified by 4-digit SIC codes that provide some indication of the proportion of establishments in an affected industry that potentially may be impacted, and the likelihood of significant small business impacts in affected industries. This information may be of value to the States as they develop implementation strategies to meet these illustrative RH progress goals.

These data show that less than 0.05 percent of establishments nationwide are potentially expected to have annual costs of 1 percent of sales or greater for each illustrative progress goal under Case A, and this is also true for Case B. The affected establishments are, in some instances, found in industries classified by 4-digit SIC codes dominated by small businesses. However, the small proportion of establishments affected in almost all potentially affected industries and the low estimates of cost as a percent of sales found in most affected industries indicates little possibility for potentially significant adverse economic impacts to small businesses from these illustrative progress goals nationwide under either Case A or B.

8.6.4 Limitations, Uncertainties, and Potential Biases

The limitations, uncertainties, and potential biases of the small entity characterization include many of those mentioned in Table 8-3 in the screening analysis section. In addition:

! It is not possible to differentiate costs for small establishments from large establishments for those establishments affected by area and mobile source control measures. Therefore, this small entity impact characterization assumes the same percentage magnitude of direct impact from area and mobile source control measures on affected smaller firms in an industry as affected larger firms.

! A small establishment is not necessarily a small entity. Small entities may own more than one establishment, large or small. Therefore, the conclusions drawn from a screening analysis conducted for small entities will not necessarily be the same as those drawn from a screening analysis conducted for small establishments.

8.6.5 Mitigation of Potential Small Entity Impacts

Control measures employed in the cost analyses provide estimates of average incremental costs, not marginal costs. Except in the case of some point source control measures, these average costs do not take into account differences in production capacity (or scale effects). So the same cost of control is applied to each affected entity in a source category, regardless of its size or other important factors. Many sources in the emission inventory may qualify as small entities under the SBA size standards, though this information is not available in the emissions inventory used for this analysis. It is possible that States may require sources to apply traditional pollution control technology or retrofit existing traditional pollution control technology. Since add-on controls can be capital intensive, the capital recovery or the fixed component of the annual cost may be a high percentage of the total annual pollution control cost. Small entities, all other factors being equal, generally have less capital available for purchase of add-on pollution control technology than large entities. In addition, the control cost per unit of production for small entities will likely be higher than for large entities due to economies of scale. Thus, control measures requiring the use of add-on control technology may cause small entities affected by State rules to experience disproportionate economic impacts compared to large entities if no strategies to mitigate potential small entity impacts are available for implementation by States.

The analysis of the potential economic impacts of the selected control measures indicates that some small entities may be adversely impacted by implementation associated with meeting these illustrative RH progress goals. Actual impacts will depend on which strategies States decide to use to achieve needed reductions in emissions. However, potential impacts can be lessened and sometimes avoided through the use of flexible implementation strategies. Consequently, EPA is encouraging States to exercise regulatory flexibility for small entities when developing strategies to comply with any RH progress goals the States choose to adopt.

While some States may need to turn to small businesses for emission reductions, small businesses will likely be among the last sources States will choose to control. States may consider controls on small businesses only if such businesses are a significant part of a Class I area's visibility problem and meeting a progress goal cannot be reached through application of all available cost-effective measures to major sources. To the extent States consider controlling small businesses, EPA believes there are many ways States can mitigate the potential adverse impacts those businesses might experience. For example, States could choose to exempt or apply less stringent requirements to small businesses. Examples of such exemptions can be seen in existing EPA air-toxic standards for the printing, hazardous waste, and pharmaceutical industries. In these rules, EPA exempted small facilities or facilities with relatively low air emissions, or reduced the recordkeeping and monitoring burdens for affected facilities. States could also extend the effective date for control requirements for small businesses to 2015 or later. Reductions needed earlier before the effective date would be obtained from other sources. In addition, applying the most cost-effective control technologies first would tend to exclude small sources which often are not very cost-effective to control. States could also choose to apply control requirements to other businesses before requiring them for small businesses.

The EPA and States also will continue to provide as appropriate compliance assistance to small businesses through compliance assistance centers and issuance of compliance guidelines designed specifically for small businesses.

Some small businesses are likely to benefit from implementation strategies associated with meeting these illustrative RH progress goals. Many suppliers of air pollution control technologies which control ozone and fine particulate precursor emissions are small businesses who will likely benefit from implementation of the progress goals.

Small businesses also may benefit from these implementation strategies if the increase in their product prices resulting from costs associated with implementation strategies exceed the increase in their costs per unit of production.

8.7 Governmental Entities Analysis - Methodology and Results

8.7.1 Introduction

This governmental entities assessment, along with the administrative costs assessment in Chapter 7, is not an unfunded mandates analysis meant to comply with the 1995 Unfunded Mandates Reform Act (UMRA) requirements (see Chapter 2), since these illustrative RH progress goals do not impose requirements upon governmental entities. This section provides an illustration of the potential impacts of the control measures used in the cost analysis on affected government entities.

8.7.2 Methodology

The governmental entities analysis consists of a screening analysis much like that for potentially affected private and nonprofit sector establishments. The calculation is conducted to identify States and counties that may potentially experience impacts as a result of compliance with the illustrative RH progress goals. Results of this analysis provide information regarding the potential severity of impacts on government entities.

Annual control costs (1990$) projected to 2015 are estimated for affected counties and States and then divided by projected revenues for those counties and States in 2015. The result is the annual cost as a percent of revenue for each potentially affected county or State. These results are estimated for annual control costs of 1 percent or greater, and 3 percent or greater.

8.7.3 Results

Federal establishments potentially affected by the control measures modeled in this analysis include military installations, sources in federally managed permit programs on Tribal lands and on the Outer Continental Shelf (OCS), Federal prisons, regional electric power organizations (e.g., the Tennessee Valley Authority (TVA)), and other federally owned or leased buildings and compounds. Federal buildings and compounds generally do not produce the type of emissions which would fall under the scope of the selected standards. As described in Chapter 4, electrical power sources are included in the baseline for the control cost analysis, including some governmental facilities. Few federal prisons may be potentially affected by these illustrative RH progress goals. The number of Tribal and OCS potentially affected are also small. Thus, most of the federal sources potentially affected are military installations.

Non-federal sources or establishments include industrial point source, mobile source, and area source emissions. A number of State-owned establishments are identified in the hypothetical control strategy analysis. These sources are incorporated in the non-federal source category under the assumption they would require similar technical services from contractors as would a privately owned source of pollution.

Control measures identified as affecting federal, State, and county-owned establishments include point, area, and mobile source measures. A list of these control measures is in Appendix E for those measures selected under Case A and Case B. There is some potential for area and mobile source control measures to impact county governments and other governmental entities. The actual number of governmental entities affected by area and mobile source measures is unknown, since area and mobile sources are not identified by individual source in the emissions inventories.

The results of the government entities analysis are presented for each illustrative RH progress goal and by emissions control case.

Case A

The results for Case A are shown in Table 8-6.   The results for Case A show that while many States and counties, particularly in the West, may potentially incur control costs associated with meeting a particular RH illustrative goal, relatively few States and counties are likely to experience a substantial cost impact. [1]

[1] The analyses in the final RIA abstracts from the ongoing successful partnership, goals establishment, and emission management strategies process undertaken by the western States that participated in the GCVTC.

Table 8-6
Summary of the Potential Impacts to Government Entities for Illustrative Regional Haze Progress Goals[a] in the Year 2015, for Case A[b] (Expressed as Average Annual Costs as a Percent of Revenues; Control Costs and Revenues Are in 1990$)

RH Progress Goals	Number of Affected States	Number of Affected Counties	Number of Counties with Control Costs Greater Than 1 Percent of Revenue (Based on County Revenues Only)[c]	Number of Counties with Control Costs Greater Than 3 Percent of Revenue (Based on County Revenues Only)[c]
1.0 deciview/15 year	16	341	134	55
1.0 deciview/10 year	18	422	168	101
5% deciview/10 year	16	380	145	75
10% deciview/10 year	27	876	224	146

[a]Represents the 4 regional haze progress goals that are being analyzed in this RIA.
[b]These results reflect visibility improvements achieved with application of fugitive dust controls along with other controls, applied as part of a least-cost optimization procedure described in Chapter 6.
[c]These results are based on county revenues being applied to cover the expense associated with potential control measures, and does not assume State funding is available to counties to cover these expenses.

Results comparing control costs for affected States to total States' revenues under emissions control Case A in the *Potential Annual Cost-to-Revenue Percentage Impacts of Regional Haze Alternatives on Government Entities* (EPA, 1999c) show that the States that have the potential for being most significantly affected for these illustrative RH progress goals are in the west. In addition, there are minimal impacts to States and counties east of the Mississippi River. Further detail concerning these impacts is contained in this report. These results are consistent with the results in Chapter 6 showing that virtually all Class I area counties east of the Mississippi River are in compliance with these illustrative progress goals in the baseline.

Case B

Table 8-7 presents the estimates of potential impacts to government entities under Case B. Again, as under Case A, while many States and counties, particularly in the west, may potentially incur control costs associated with meeting a particular RH illustrative goal, relatively few States and counties are likely to experience a substantial cost impact.[1]

Table 8-7
Summary of the Potential Impacts to government Entities for Illustrative Regional Haze Progress Goals[a] in the Year 2015, for Case B[b] (Expressed as Average Annual Costs as a Percent of Revenues; Control Costs and Revenues Are in 1990$)

RH Progress Goals	Number of Affected States	Number of Affected Counties	Number of Counties with Control Costs Greater Than 1 Percent of Revenue (Based on County Revenues Only)	Number of Counties with Control Costs Greater Than 3 Percent of Revenue (Based on County Revenues Only)
1.0 deciview/15 year	14	343	117	38
1.0 deciview/10 year	19	631	152	85
5% deciview/10 year	19	572	141	72
10% deciview/10 year	29	1,129	253	106

[a]Represents the 4 regional haze progress goals that are being analyzed in this RIA.
[b]These results reflect visibility improvements achieved without application of fugitive dust controls applied as part of a least-cost optimization procedure described in Chapter 6.

Results comparing control costs for affected States to total States' revenues under emissions control Case A in the *Potential Annual Cost-to-Revenue Percentage Impacts of Regional Haze Alternatives on Government Entities* (EPA, 1999c) show that the States that have the potential for being most significantly affected for these illustrative RH progress goals are in the West. In addition, there are minimal impacts to States and counties east of the Mississippi River. Further detail concerning these impacts is contained in the report mentioned above. These results are consistent with the results for Case B in Chapter 6 showing that virtually all Class I area counties east of the Mississippi River are in compliance with these illustrative progress goals in the baseline.

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[1] The analyses in this final RIA abstracts from the ongoing successful partnership, goals establishment, and emission management strategies process undertaken by the western States that participated in the GCVTC.

A qualitative comparison of the potential impacts between Case A and Case B shows that more States and counties are affected in Case B compared to Case A. Results from the control strategy analysis also show that more counties may choose to apply additional control to their point and mobile sources, and to provide programs for voluntary reduction in residential wood combustion emissions. Selection of mobile source controls (in particular, the on-highway heavy-duty diesel retrofit program) and programs for voluntary reduction of residential wood combustion emissions occurs in a larger number of counties and States in Case B compared to Case A. It should be noted, however, that direct comparison of results from the two emissions control cases must take into the account their differences in post-control air quality. Results for the two emissions control cases represent findings of potential impacts for different post-control air quality profiles and, as such, direct quantitative comparison is not warranted.

8.7.4 Limitations, Uncertainties, and Potential Biases

The limitations, uncertainties, and potential biases of the governmental entities' assessment include many of the limitations mentioned in Table 8-5 in the screening analysis section. In addition:

! It is difficult to determine the type of government body that provides most of the funding to cover the expense incurred by a county or State associated with implementing many of these control strategies. This makes it difficult to determine in many cases the government body that will experience the potential impact from implementing these control strategies.

8.8 Plausibility Checks

The need for plausibility checks to validate the credibility of these results is important to assure the potentially affected States that these analyses provide a useful picture of potential economic impacts associated with these illustrative progress goals. Review of the data and assumptions for these screening analyses showed that the data used are the best available for input, and the assumptions on how cost allocations are derived for the private and nonprofit establishments are reasonable. Examination of the plausibility of the results from the governmental entities analysis, however, showed that the fugitive dust controls may impose potentially significant impacts upon a number of western States. After review of these results, the assumptions behind the analysis were revised. This review, along with other factors relating to uncertainties in the baseline inventory data, led the EPA to provide analyses including those for the screening for a control case in which no fugitive dust controls are applied.

8.9 References

Nestor, D.V.; Pasurka, C.A. (1995), Environment-Economic Accounting and Indicators of the Economic Importance of Environmental Protection Activities. *The Review of Income and Wealth.* 41: 265-287.

U.S. Department of Commerce (1989), 1987 Census of Agriculture, Volume 1. Geographic Area Series, Part 51: United States Summary and State Data. Bureau of the Census; Washington, D.C., November; Series no. AC-87-A-51.

U.S. Department of Commerce (1990a), 1987 Census of Governments. Bureau of the Census; Washington, D.C.

U.S. Department of Commerce (1990b), BEA Regional Projections to 2040, Volume 1: States. Bureau of Economic Analysis; Washington, DC: U.S. Government Printing Office; June.

U.S. Department of Commerce (1991), Enterprise Statistics: Company Summary (ES87-3). Bureau of the Census; Washington, D.C.

U.S. Department of Commerce (1992), Business Statistics, 1963-1991. Bureau of the Census; Washington, DC: U.S. Government Printing Office; June.

U.S. Environmental Protection Agency (1995), The U.S. Environmental Protection Industry: A Proposed Framework for Assessment. Office of Policy, Planning and Evaluation; Washington, D.C.; EPA report no. 230/R-95-011.

U.S. Environmental Protection Agency (1996a), Industry Profile for Review of the National Ambient Air Quality Standards for PM_{10}. Final Draft. Prepared by E.H. Pechan and Associates, Inc. for the Office of Air Quality Planning and Standards; Research Triangle Park, N.C.; September.

U.S. Environmental Protection Agency (1997a), Control Measure Evaluation for the Integrated Implementation of the Ozone and Particulate Matter National Ambient Air Quality Standards, and Regional Haze Program. Final Review Draft. Prepared by E.H. Pechan and Associates, Inc. for the Office of Air Quality Planning and Standards; Research Triangle Park, N.C.; April.

U.S. Environmental Protection Agency (1999a), Potential Annual Cost to Sales Percentages Impacts of Regional Haze Alternatives on Private and Nonprofit Entities. Final Draft Report. Prepared by the Pechan-Avanti Group for the Office of Air Quality Planning and Standards; Research Triangle Park, N.C.; April.

U.S. Environmental Protection Agency (1999b), Potential Annual Cost to Sales Percentages Impacts of Regional Haze Alternatives on Private and Nonprofit Entities, No Fugitive Dust Controls Allowed. Final Draft Report. Prepared by the Pechan-Avanti Group for the Office of Air Quality Planning and Standards; Research Triangle Park, N.C.; April.

U.S. Environmental Protection Agency (1999c), Potential Annual Cost to Revenue Percentage Impacts of Regional Haze Alternatives on Government Entities. Final Draft Report. Prepared by the Pechan-Avanti Group for the Office of Air Quality Planning and Standards; Research Triangle Park, N.C.; April.

U.S. Environmental Protection Agency (1999d), Potential Annual Cost to Revenue Percentage Impacts of Regional Haze Alternatives on Government Entities, No Fugitive Dust Controls Allowed. Final Draft Report. Prepared by the Pechan-Avanti Group for the Office of Air Quality Planning and Standards; Research Triangle Park, N.C.; April.

U.S. Office of Management and Budget (1987), Standard Industrial Classification Manual 1987. Executive Office of the President; Washington, DC.